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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Igor KOTLIAR
Serial No. : 10/726,737
Filing Date : December 3, 2003
Title of Invention : Hypoxic Aircraft Fire Prevention and Suppression System
With Automatic Emergency Oxygen Delivery System
Group Art Unit : 3752
Examiner : Steven J. GANEY [Phone: 571-272-4899]
Confirmation No. : 5831
Date of Action: : December 14, 2007

Mail Stop: Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

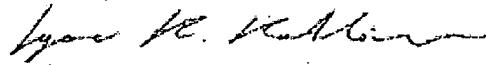
Facsimile Transmission

Number: 571-273-8300

Date of transmission: 13 March 2008

I hereby certify that this correspondence is being transmitted to the U.S.P.T.O. fax # 571-273-8300 on the date indicated above and is addressed to the Commissioner for Patents, P.O. box 1450, Alexandria VA 22313-1450

Igor K. Kotliar



DECLARATION UNDER 37 C.F.R. § 1.132

I, John Brooks, do hereby declare that:

1. I am a retired Naval Officer with twenty-five years of active naval service. After retiring from the US Navy in 1993, I joined Mach II Aviation, an FAA repair station, as vice president, and was responsible directing the development of global positioning system (GPS) for commercial aerospace applications.

2. In 1995, I joined International Aero, Inc. also an FAA repair station, as director of purchasing. While in purchasing, I was asked by the United States Department of Transportation to provide information about oxygen generators to help with the ValueJet accident investigation. In 1997, I was reassigned as Director of Research in the newly formed Fire Protection Laboratory. At that time I began focusing on aerospace applications of Halon alternative fire fighting agents and condensed aerosols.

3. Due to my expertise in fire suppression systems acquired over my years of work, I was asked by Safety Board of Canada to help with the investigation of the crash of Swiss Air 111. My research into ignition sources in airliner fires led to the development of the Arc Fault Circuit Protection for aerospace application. I was instrumental in identifying aging wiring, hidden fire detection, and developing new alternative fire suppression systems in commercial aircraft. The detection and location of wiring defects in aging aircraft has gained and industry wide focus, with a goal of mitigation the electrical arcing as an ignition source, and wiring failures for airliner electrical system malfunctions.

4. In 1998, while still employed at International Aero, I formed FirePak Oil and Gas Industries LLC, to exploit fire suppressive technology and to promote and market Pyrogen condensed aerosols in the Americas.

5. In 2004 International Aero's Fire Protection Laboratory was sold to Doll

Technologies. At that time, I became the Director of Research and President of RedBrooks Laboratories. In 2006, RedBrooks Laboratories was reformed into StillBrooks Laboratory, where I continue as President and Director of Research.

6. I am a member of NFPA, IAFC, IAFPA, IWMA, SAE, AUVSI, and sit on both the FAA International Aircraft Systems Fire Protection and Aircraft Materials Fire Test Working Groups, the Aging Aircraft Wiring Working Group. I also am a member of NFPA 2010 and SAE AE8 standards committees. All of these memberships and committees relate safety in the field of fire suppression, risk mitigation and fire prevention in the aerospace industries. I also have published approximately six papers and delivered approximately 35 presentations in the field of fire prevention and suppression in aerospace applications.

7. I am not an employee of Firepass IP Holdings, Firepass Inc., or Igor (Gary) Kotliar. However, I first met Mr. Kotliar at a fire prevention industry conference where he had a booth demonstrating his hypoxic air technology, and I have known Mr. Kotliar since at least 2000. From my work in the field of fire prevention and suppression, I am generally familiar with and understand Mr. Kotliar's work on hypoxic (oxygen-depleted) air and its applications in aircraft and other environments. In November 2003, Mr. Kotliar and I (and others) collaborated on a presentation titled "Cargo Compartment Alternative MPS Testing using Low Pressure Dual Fluid Water Mist and Hypoxic Air," that I delivered at the International Aircraft Systems Fire Protection Working Group Meeting, November 5-6, 2003 at the Trump Taj Mahal Casino-Hotel in Atlantic City, NJ, a copy of which is attached hereto as Exhibit A. This past year, at Mr. Kotliar's request, I traveled from my home near Seattle Washington to San Diego, California to attend a meeting of the National Fire Protection Agency to assist Mr. Kotliar in his efforts to have hypoxic air adopted as a

standard agent useful for fire suppression. I was reimbursed by Mr. Kotliar for my travel expenses (air, hotel, automobile rental, and food). Other than this reimbursement, I have not been employed by or received compensation as a consultant or otherwise from Mr. Kotliar or Firepass. I am not being compensated in connection with my preparation of this declaration at my normal hourly rate of \$250.00. No part of my compensation is dependent on the outcome of this patent application response or proceeding.

8. I am familiar with the United States Patent Application No. 10/726,737 and the Specification thereof, the pending claims as set forth in the Supplementary Amendment dated September 20, 2007, the Examiner's Action dated December 14, 2007 ("Action"), the Glenn et al. U.S. Patent No. 4,681,602 ("Glenn") and Lambersten et al. U.S. Patent No. 4,807,706 ("Lambertson"), all in connection with this patent application prosecution

9. This declaration is being submitted to respond to the Examiner's Statement in the Official Action that the pending claims 16-19, 21, 24, 25, 28, 31, 32, 35, 36, 40, and 46-71 (hereinafter the "claims") are "rejected under 35 U.S.C. 103(a) as being unpatentable over Glenn et al. in view of Lambersten et al." (Action, page 2). My understanding of the Examiner's rejection is that the Examiner believes the claims are obvious over Glenn in view of Lambersten. In this declaration, I am addressing only these claims and the Examiner's rejections of them.

10. I respectfully disagree with the Examiner's comments about the rejected claims as set forth above.

11. In my experience, a person of ordinary skill in the art in this technical field would be a person having an education in science and 10 years of experience working in the field of fire Protection.

12. In my opinion, the Examiner's rejection of the claims for obviousness is flawed.

Although Glenn does describe a method of generating or manufacturing the nitrogen enriched or hypoxic fire extinguishing compositions (also called oxygen-depleted air or ODA), as disclosed by Kotliar in this application, Glenn teaches a person of ordinary skill in the art to use a gas generation method or apparatus that produces the hypoxic air, fire extinguishing composition using two distinct air separation modules, and that the oxygen content used for inerting fuel tanks should be 9% or less. See Glenn, Col. 6, lines 39-41. In fact, Glenn expressly discloses that using only the first air separation generator component to obtain the waste or nitrogen enriched gas could produce an oxygen concentration of about 12%-15% (Glenn, Col. 8 lines 8-14), but does not teach or suggest that such an oxygen content gas can be used to inert a fuel tank. Instead, Glenn teaches a person of ordinary skill in the art that a second air separation component must be used to reduce the oxygen content to 9% or less for such inerting purposes. Further, Glenn teaches that the first air separation generator component is used to reduce the oxygen content to a level that a second air separation generator component can be used more efficiently to reduce the oxygen content of the waste gas component to the desired 9% or less, and, correspondingly, to increase the oxygen enriched component to 95% or more. See Glenn, Col. 8, lines 32-38.

13. In my opinion, the Glenn patent does not teach or suggest to a person of ordinary skill in the art to separate air into oxygen-enriched and oxygen-depleted components and to supply the oxygen-depleted component in a compartment in an aircraft to maintain an oxygen content in that compartment of between 10 and 16%, or 12 and 16%, or 10 and 12%, as variously called for the independent claims.

14. In my experience, the aviation industry has consistently followed the teaching of Glenn in providing an oxygen concentration of 9% or less to inert fuel tanks of aircraft. This practice predates Glenn's publication in 1987, and has continued since until approximately 2006,

when the FAA endorsed Kotliar's proposal to use hypoxic air, having an oxygen content of more than 9%, more particularly from 10% or 12% to about 15.5%, to inert compartments on aircraft, in particular center wing fuel tanks. The FAA cited to tests it had performed that essentially replicated the tests that Mr. Kotliar had performed and reported in his Specification. More recently, in 2007, the FAA put in place new safety regulations that, contrary to the longstanding practice in the industry, now require an oxygen depleted gas of between 10% and 16% to inert center wing fuel tanks on Boeing and Airbus aircraft, to prevent fires from breaking out in those tanks.

15. I also disagree with the Examiner that it is proper to combine the Glenn and Lambersten patents. In my opinion, a person of ordinary skill in the art seeking to use the air separation technology of Glenn would not look to the Lambersten patent to make any modifications of the Glenn apparatus for a number of reasons.

16. First, in referring to Lambersten, the Examiner is mistaken in assuming that Lambersten discloses determining a breathable fire extinguishing gas with reduced oxygen concentration only. Rather, the Lambersten reference is basically flawed in that the entire premise of Lambersten is to cause an increased respiration rate caused by the additional carbon dioxide injected in the atmosphere. See, Lambersten, Col. 2, lines 54-58. Since metabolic CO₂ is used by mammals to determine respiratory requirements, the addition of CO₂ tricks the body into faster breathing rates. The reduction in oxygen to prevent the fire and maintain a breathable composition does not require the addition of carbon dioxide. In Lambertsen, the oxygen reduction is offset by an increase in heart and breathing rates in the subject mammalian species. The Examiner's reference to the Lambersten in the Action is thus flawed from the outset.

17. Second, considering the Lambersten teaching, id discloses that using rats may be a good base line for determining whether a gas is breathable, but the flammability limits found in the

tests reported must also be offset by the added CO₂ used to dilute the atmosphere. Thus, the Examiner is comparing apples and oranges, and I believe a person of ordinary skill in the art would understand that the Lambersten teaching is fundamentally different than, and does not teach or suggest, the subject matter of the rejected claims.

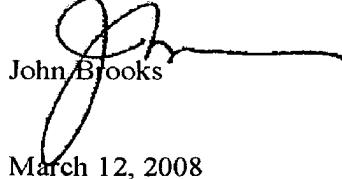
18. Third, the Hypoxic fire preventative compositions referred to in the Kotliar Specification, and for that matter in the Glenn reference, contains no CO₂, or any other added gas to increase the metabolic rates in mammals or otherwise affect the breathability of the gas. Rather, as disclosed in the Kotliar Specification, the Hypoxic composition is strictly an Oxygen Depleted Air (ODA). Although the percentages of oxygen referred to by Kotliar of between 10% and 15.5% are within the 8% to 15% range of Lambersten, the latter requires added amounts of carbon dioxide to achieve the results desired, and therefore Lambersten does not teach or suggest the oxygen-depleted gas mixture of the percentage oxygen ranges of the rejected claims. In other words, in my opinion, a person of ordinary skill in the art would not understand from Lambersten that one could increase the oxygen content of oxygen-deplete air without adjusting the carbon dioxide level as taught by Lambersten. Stated otherwise, Glenn teaches a person of ordinary skill in the art to use an oxygen depleted air of 9% or less, whereas Lambersten teaches to use an air that is oxygen depleted at 8-15% but supplemented with CO₂ of 2 to 5%, but there is no indication to a person of ordinary skill in the art, in either Glenn or Lambersten, to change only the oxygen content without changing the CO₂ content. Consequently, in my opinion, the subject matter claimed by Kotliar in the pending rejected claims would not have been obvious to a person of ordinary skill in the art based on Glenn in view of Lambersten, because neither Glenn nor Lambersten, considered alone or in any combination, teach or suggest those rejected claims. It should be understood that given the source of the air in the Kotliar claims, there inherently is no CO₂ supplementation in the oxygen-

depleted mixture in Kotliar's claims, and therefore the claims are fundamentally different than what Lambersten teaches.

19. Lambersten's work is all based on small scale testing with rats. Although is an impressive study it is based on adding carbon dioxide to the atmosphere to increase metabolic rates to make up for the lack of oxygen in the composition. Research that I conducted in my laboratory Sept-Oct 2003, indicates Kotliar's data was based on full scale testing done to the FAA test methods with respect to preventing fires in fuel tanks. Kotliar's Hypoxic Air composition with an oxygen content of between 10% and 15%, without added CO₂, is in my opinion a unique agent and is different than the compositions of gasses described by both Glenn and Lambersten..

The undersigned being warned that willful false statements and the like are so punishable by fine or imprisonment or both, under 18 U.S.C. 1001, and that such willful false statements and the like may jeopardize the validity of the application or any patent issuing therefrom, declares that all statements made of his own knowledge are true and that all statements made on information and belief are believed to be true.

Respectfully submitted,



John Brooks

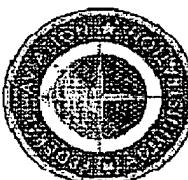
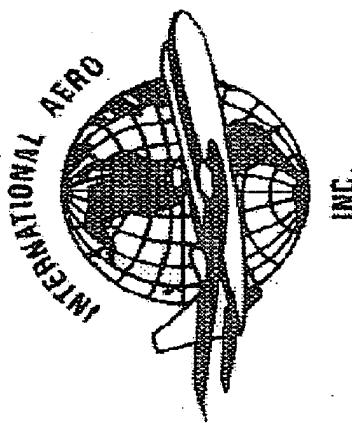
March 12, 2008

Cargo Compartment alternative MPS testing using Low Pressure Dual Fluid Water Mist and Hypoxic Air

International Aero Inc.

FAA & JAA Repair Station IQNR 108K

Fire Protection Laboratory

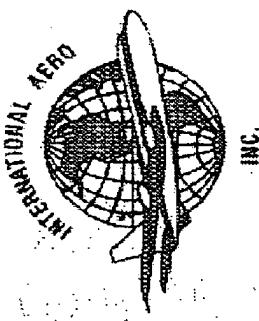


International Aircraft Systems Fire Protection Working Group

November 5-6, 2003

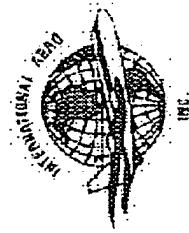
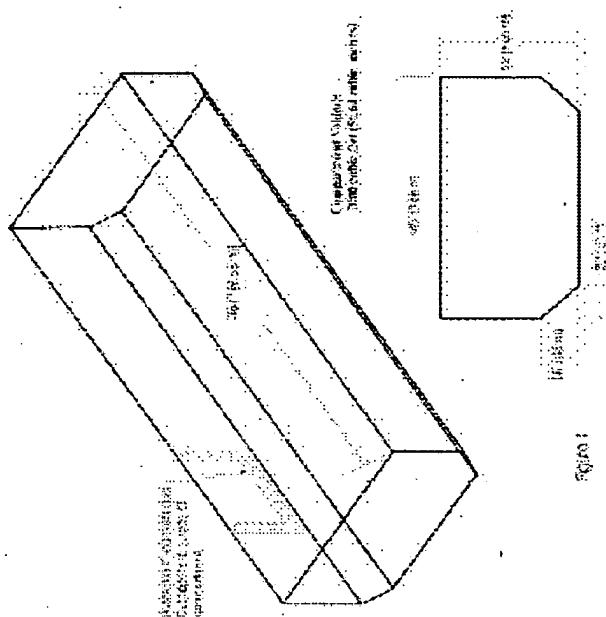
System Participants

- IAI
- FirePASS
- Air Liquide



Background

Started looking at misting in 1998 as a Halon alternative along with condensed aerosols.



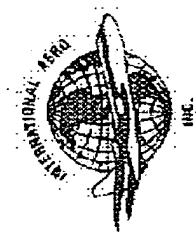
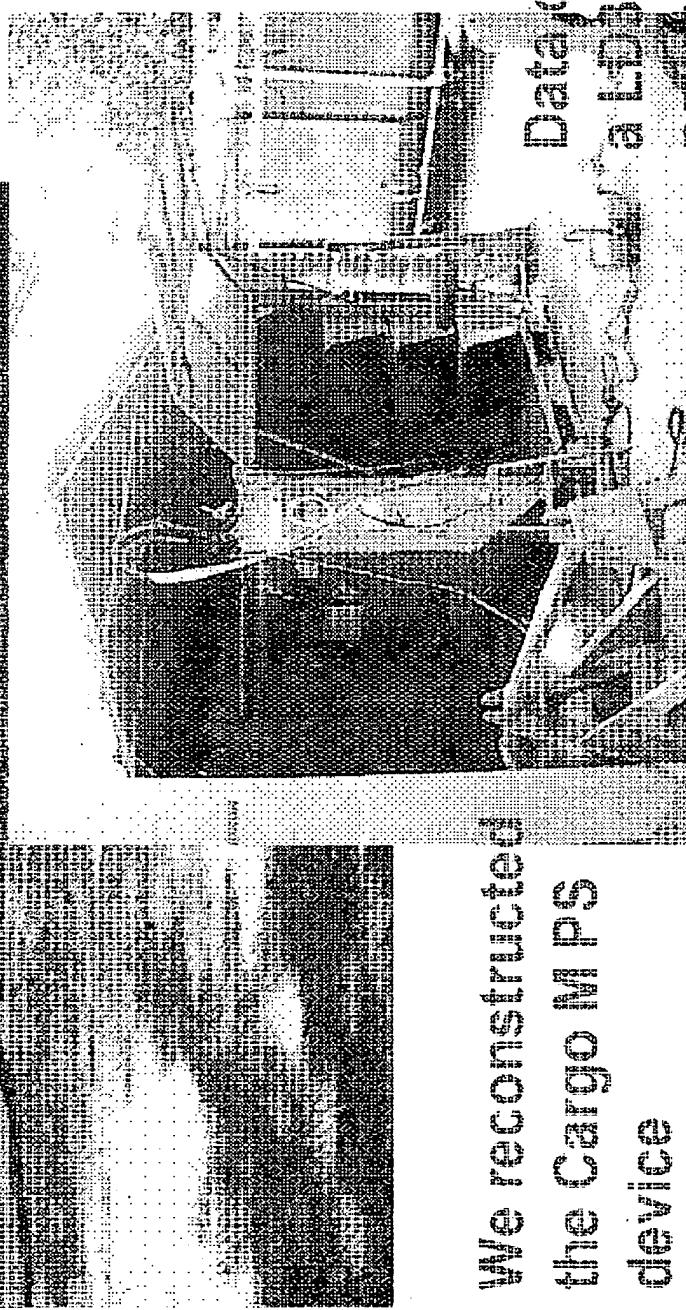
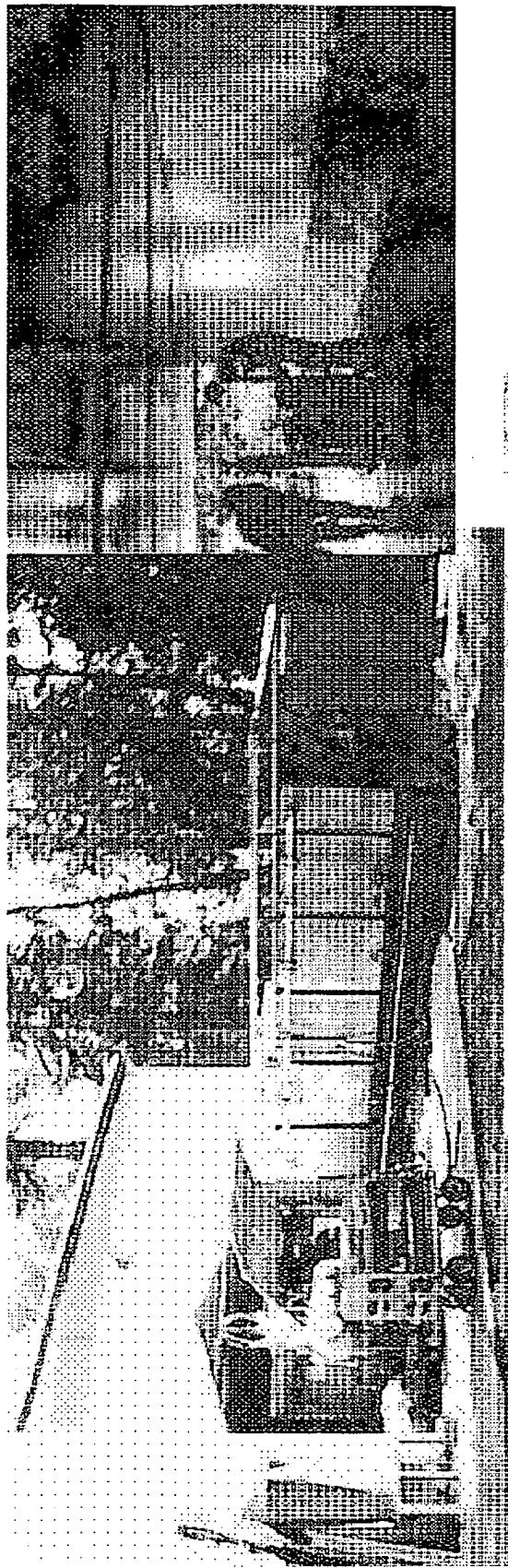
Full scale Cabin ground based testing

May 1999

Flight test Aug 2001

Rebuilt the MPS device in May 2003

Testing on going



We reconstructed
the cargo maps
device

Data collection in
a flight cargo
panel alongside

System Goals

Use existing systems and equipment where ever possible

Be lighter, cheaper and, more efficient

With a lower overall life time cost

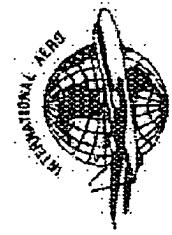
be ready for the future

Be better than any gas system, Level of safety

- longer duration**

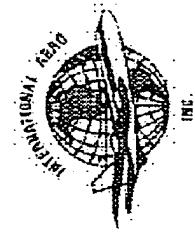
- lower temperatures**

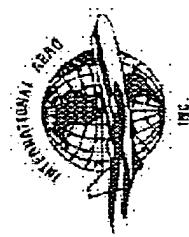
- less damage to the air vehicle**



Extinguishing Agent chemistry

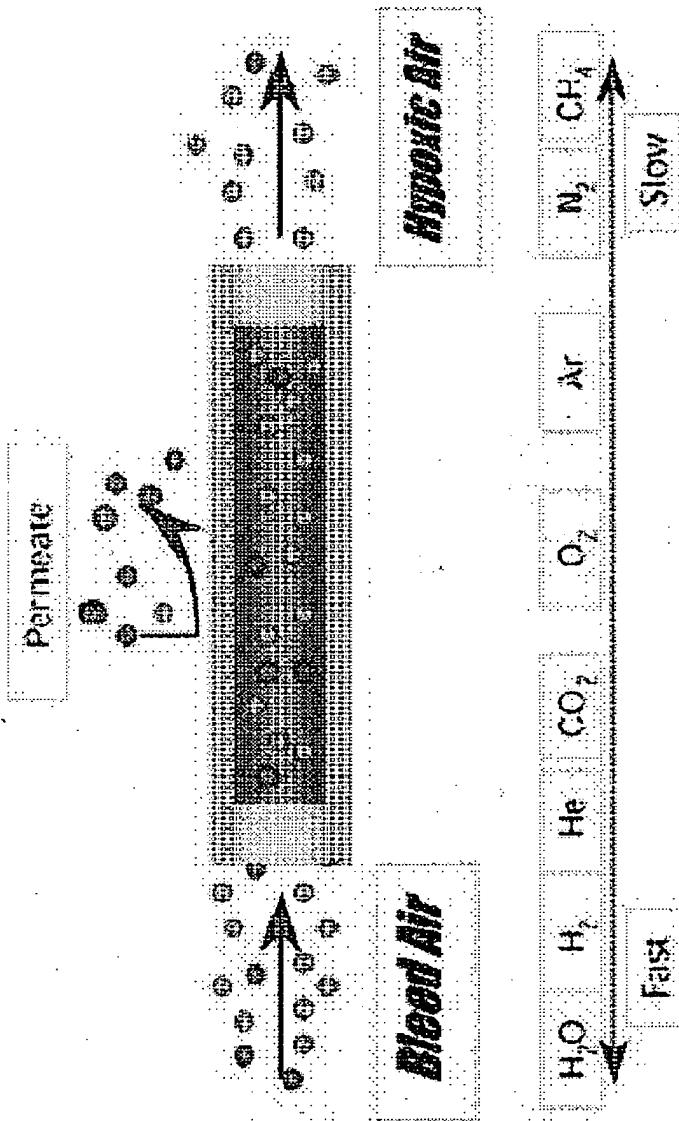
- Name Air ; (Hypoxic Air)
 - Snap listed in July 2003
- UN Transportation Code **UN1002**
- **Gas Properties:** Gas density (1.013 bar at boiling point) : 3.2 kg/m³
 - Specific gravity (air = 1) (1.013 bar and 21 °C (70 °F)) : 1
 - Specific volume (1.013 bar and 21 °C (70 °F)) : 0.833 m³/kg
- Normal composition of dry air:
 - Gas Concentration (% vol.) ppm or ppb Agent
 - N₂ 78.09%
 - CO₂ 330 ppm
 - H₂ 500 ppb
 - O₂ 20.94% 15.2% Or 10%
 - Ne 18 ppb
 - Xe 86 ppb
 - Ar 0.93%
 - He 5.2 ppm
 - Rn 6.10⁻¹¹ ppb
 - Kr 1.1 ppm



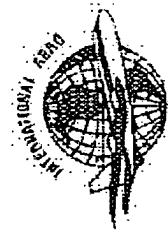
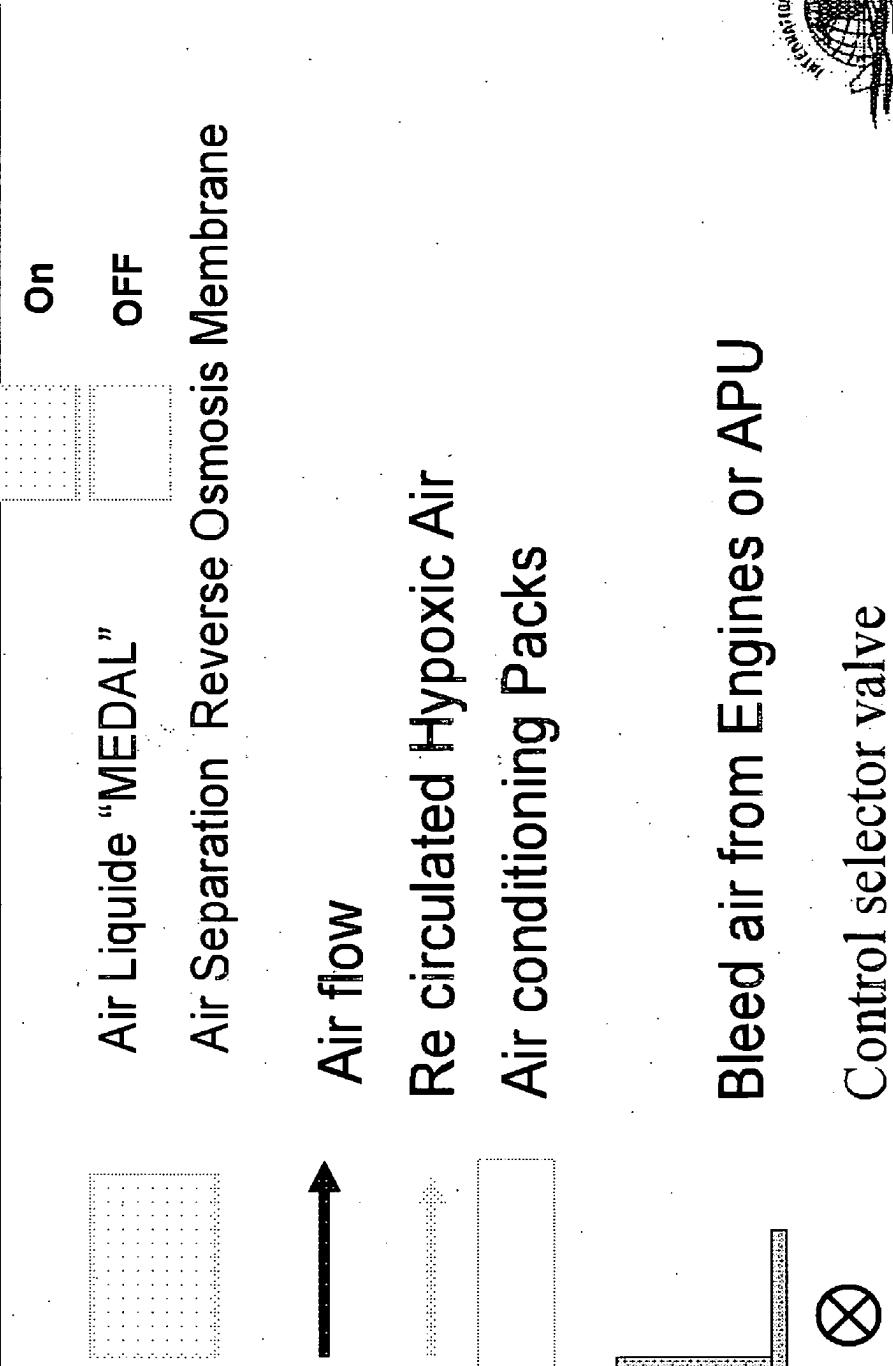
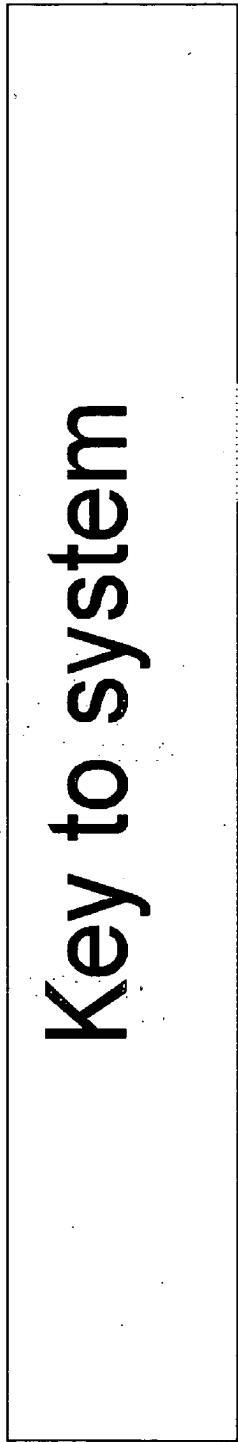


Hollow Membrane Diagram

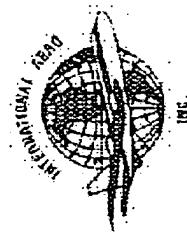
(it's just a bunch of small tubes that leak O₂)



Key to system



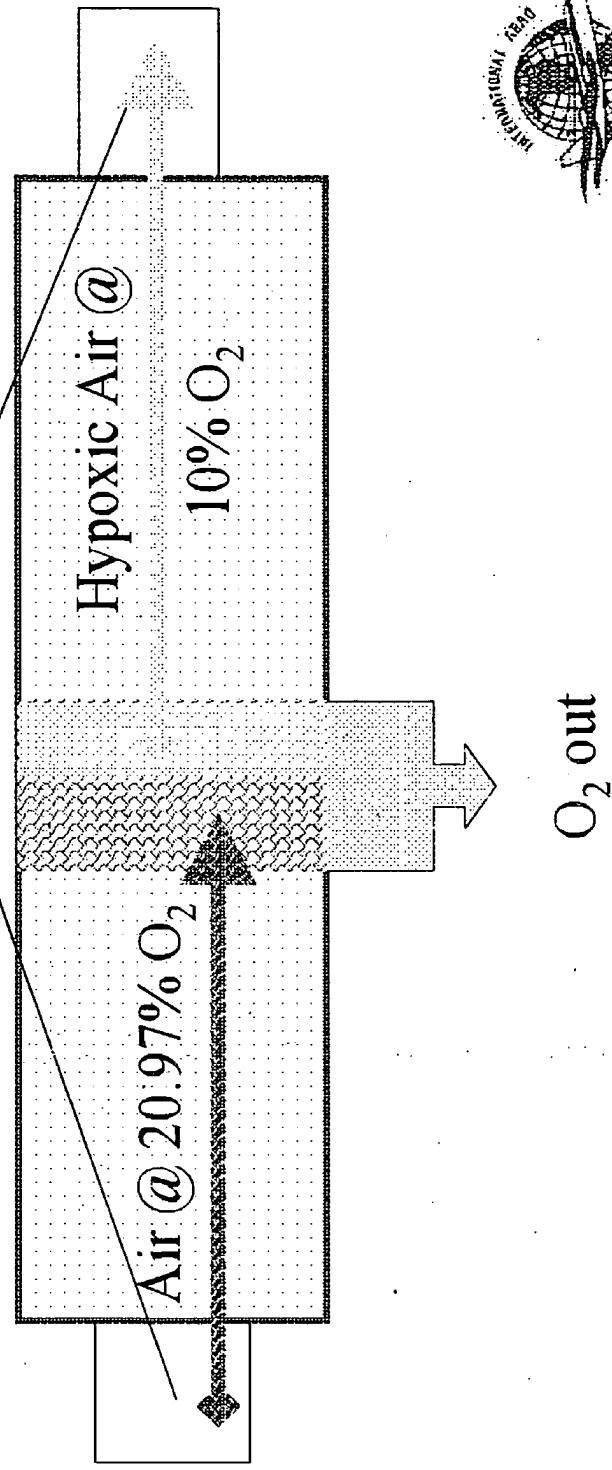
Nov 2003 IAI proprietary



MEDAL Membrane Filter

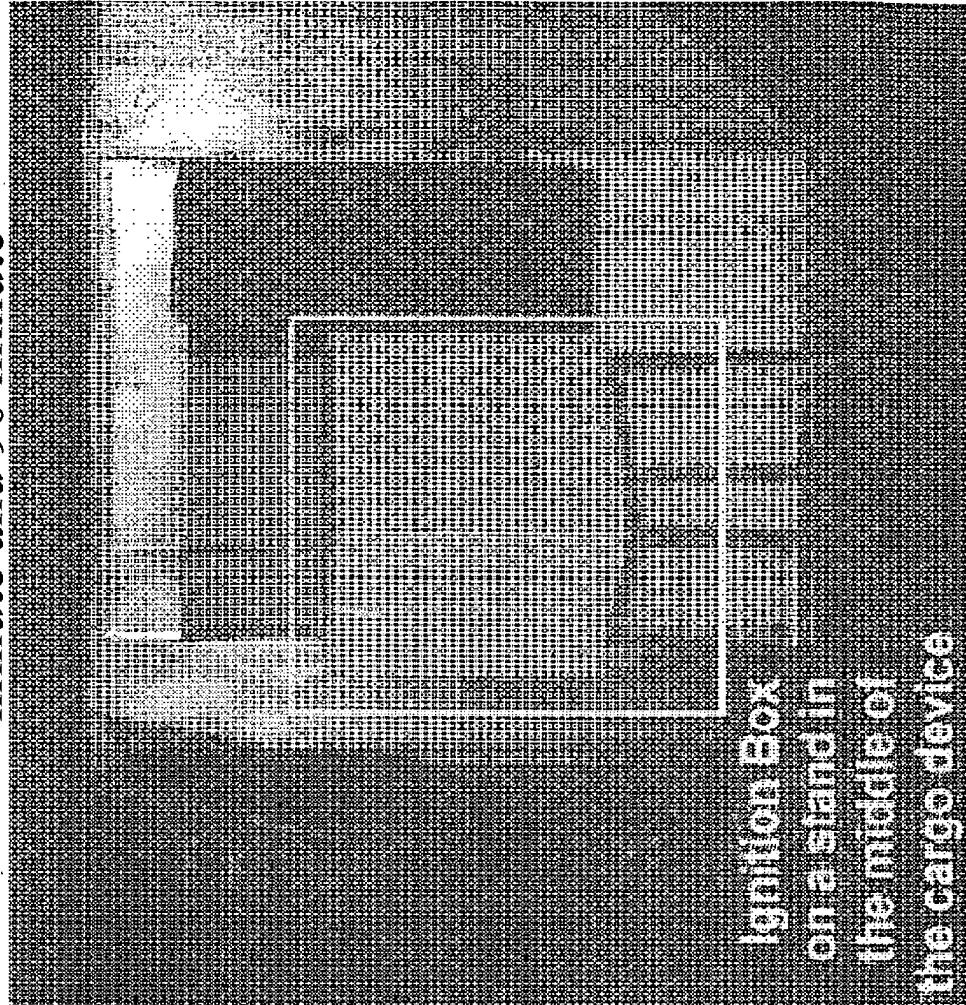
Hypoxic air out
to the system

Bleed air or
re-circulate air



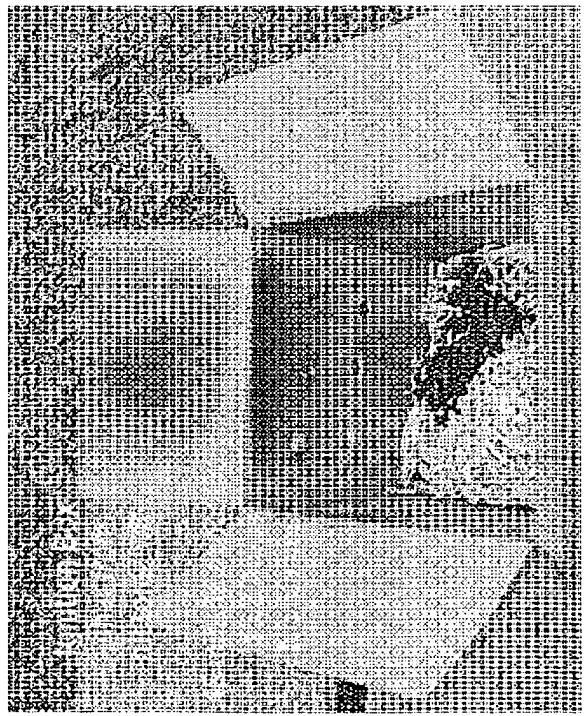
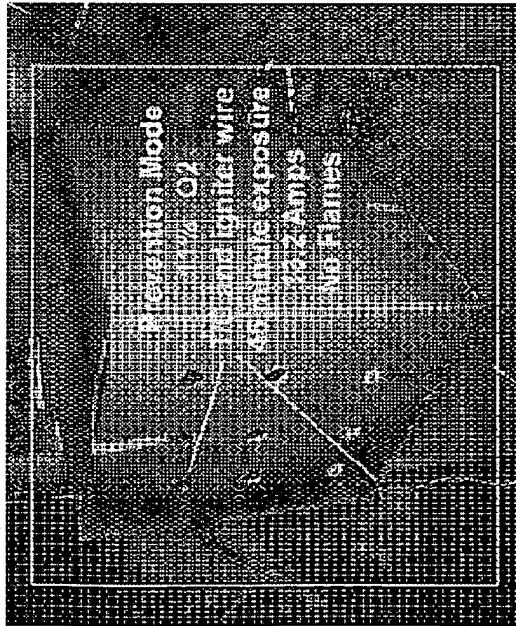
Phase II FirePASS Preventive

- Use the Bulk load igniter box
- Place in center of the Cargo MPS device
 - reduce the O₂ to 14%
 - apply power to the NiCrome wire
- Wait for the smoke to clear.



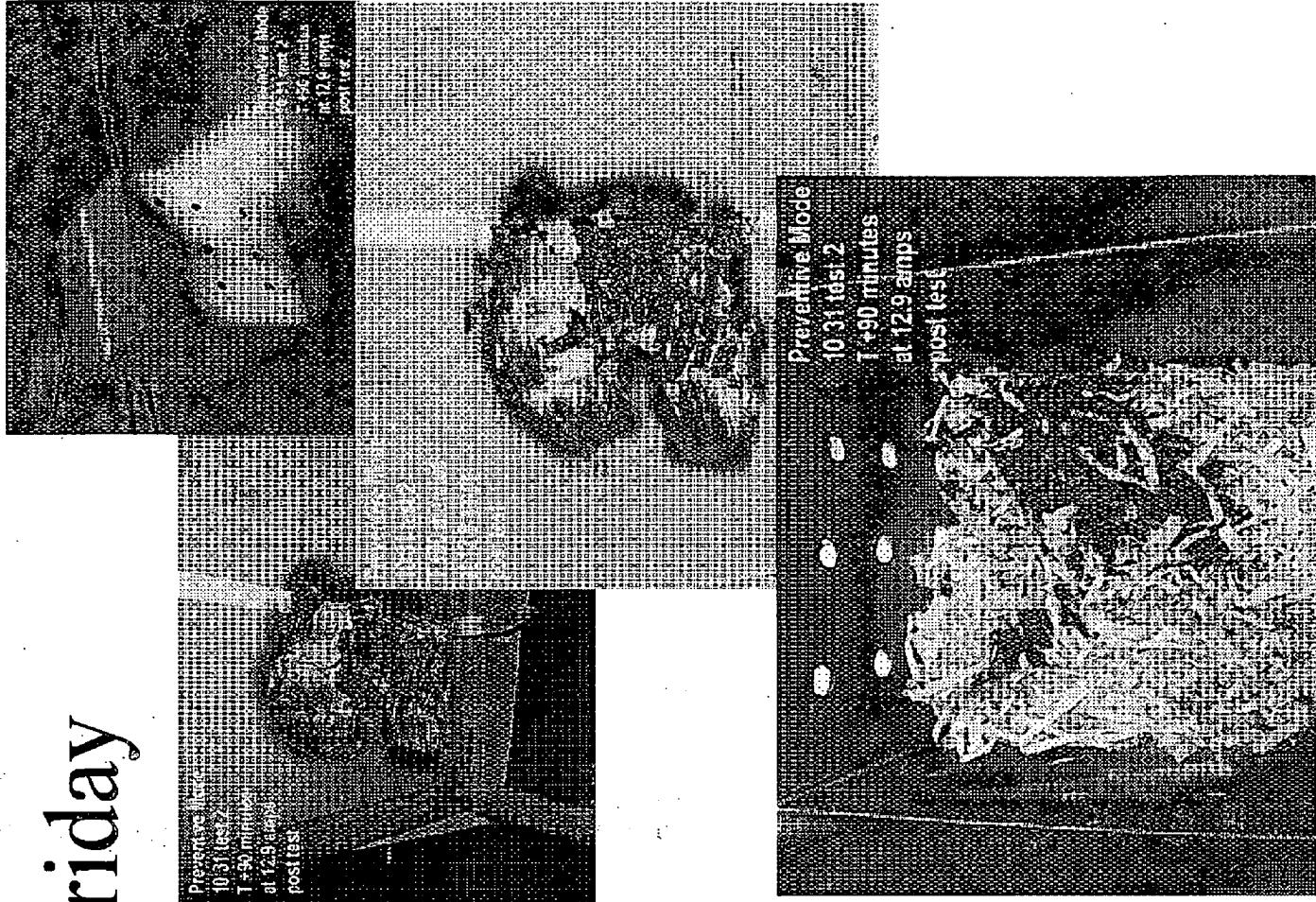
Test one last Thursday

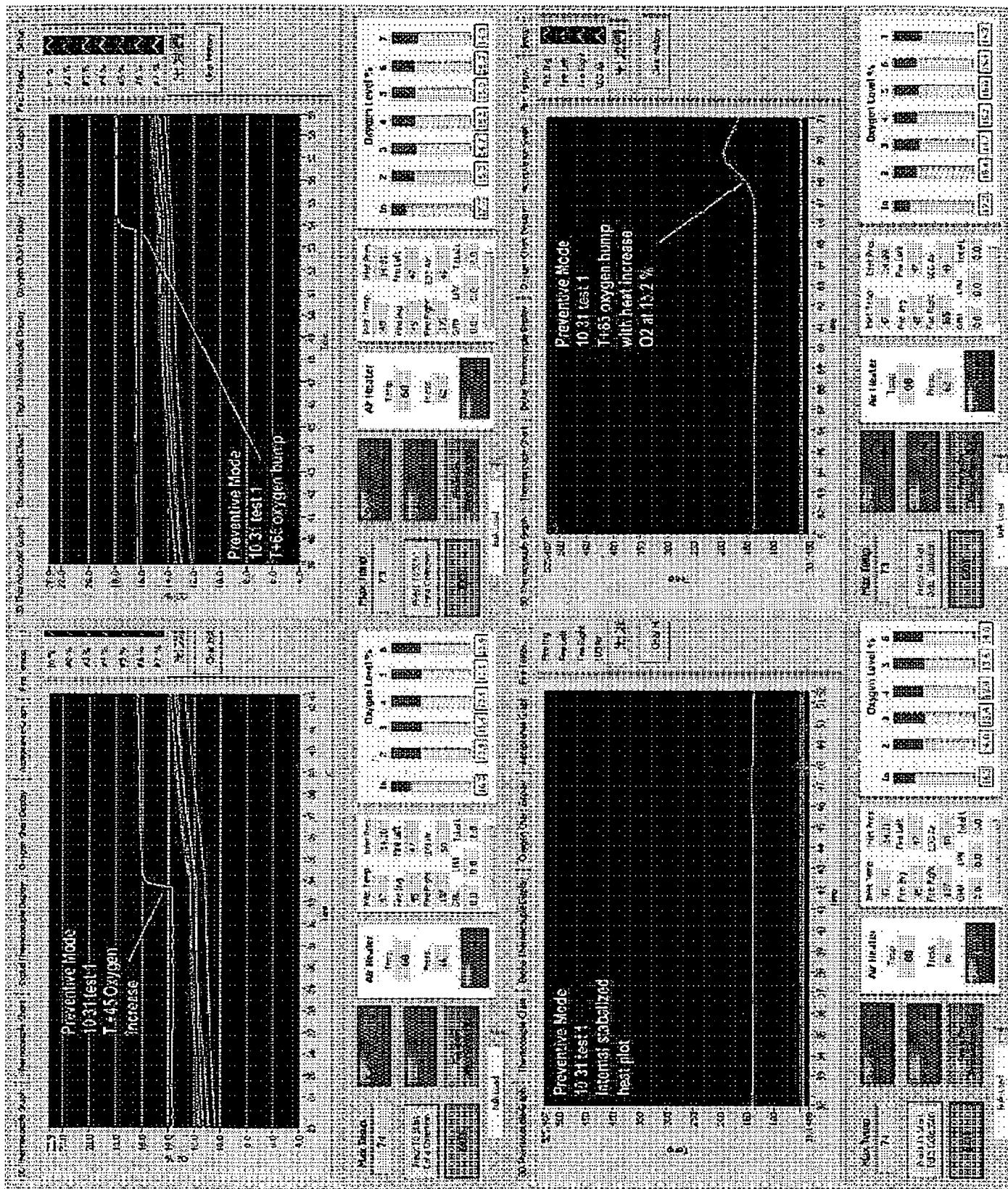
- 45 minute with power applied
- Temp went to 325 F for 10 minutes then stabilized at 145 F
- Some char and discoloration inside the box NO FLAMES



Test two last Friday

- Same test set up
 - (same box with new paper)
- 90 minute test
- Power applied at 14% oxygen content T=0
 - Temps +350 F for 20 minutes
 - after temp drop and stabilized at 137 F, we increased the O2 by 1% every 20 minutes
 - ignition wire dropped and burned through the bottom of the box with NO FLAMES
- We started to see a 40 Deg F temp rise at 15.2% O2 at T+84 minutes. Stopped the test at 90 minutes
 - future test planned





- Data was collected with virtual instruments constructed with "National Instruments" LabView DAQ software and a SCXI signal conditioner
- Test data and remote video observations available via TCP/ IP connection

Data is updated and posted at

<http://www.internaero.com/ATMELab.htm>

- For further information contact:

John Brooks

Director of Research

International Aero Inc

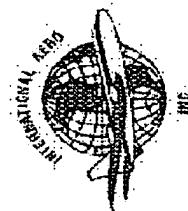
11817 Westar Lane

Burlington Wa. 98233

P 360 757 2376 F 360 757 4841

<http://www.internaero.com/ATMELab.htm>

<http://www.internaero.com/ATMELab.htm>



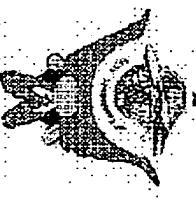


INC.

"Your Interior Configuration Specialist"

Please rank your

Fire Lab



No Animals real or imaginary were injured while performing these test

FROM : Hypoxic Inc.

FAX NO. : 212 213 3247



Photo illustration by
Keith Shunney;
photo by Spencer Platt,
Getty Images

How the Bush team will try to paint Kerry

The plan: Depict him as liberal, insider, flip-flopper

Judy Keen
USA TODAY

WASHINGTON — President Bush's campaign strategists believe "Massachusetts liberal" is a potent political epithet. But they don't think it's enough to defeat Massachusetts Sen. John Kerry.

So the Bush team, which believes **ORY** Kerry has the nomination wrapped up, is preparing a broad attack on his record over 19 years in the Senate and what they'll call his opportunistic reversals on key issues. The faceoff between Bush and Kerry has been extraordinarily early in volleys of press re-

leases and Web videos. It will continue for eight months and signals a long, nasty campaign. Decisions being made now will define the territory on which the campaign is fought and establish competing portraits of the two men.

Already, Republicans are depicting Kerry as a product of Washington, beholden to special interests and out of touch with regular Americans. The "Massachusetts liberal" tag that worked so well when the elder George Bush used it to defeat Gov. Michael Dukakis in the 1988 presidential race is just part of the case this Bush will try to make, aides say.

The drawback to the Bush strategy is that much of it has been tried before, most recently by Kerry's rivals for the nomination. Former Vermont governor Howard Dean called Kerry "the handmaiden of special interests," and retired

Please see COVER STORY next page ▶

Eisner board rejects Comcast's bid

Stock swap offer n as too low

Michael McCarthy
DAY

Disney's board of directors in San Francisco, Calif., said Monday that it unanimously rejected Comcast's \$48 billion, all-stock takeover as inadequate but would consider a higher bid.

The board added that it has confidence in the direction of the company under the leadership of Michael Eisner.

"We are committed to creating shareholder value now and in the future and will carefully consider any proposal that would further that objective," said David, led by former U.S. senator

George Mitchell.

Disney noted that its stock was trading roughly \$3.60 a share above Comcast's offer, worth \$23.32 per Disney share at Friday's close.

Comcast countered that its offer "reflects a full and generous valuation" based on Disney's long-term performance.

"We maintain the belief that our merger proposal represents a sound and compelling proposition for both sets of shareholders," said the Philadelphia-based company, which, with 21.5 million subscribers, is the nation's largest cable operator.

The rejection is the latest twist in the fight for Disney, whose famous icons include Mickey Mouse, ABC, ESPN and the Disney theme parks, stores and cruise ships.

Comcast could sweeten its offer to more than \$30 a share or dangle

the possibility of cash to try to split Disney's board away from Eisner's side. But with Comcast shares falling and Disney's stock rising over the past few days, Comcast shareholders could end up with less than half of the combined company vs. 58% in the initial bid.

The rejection by Disney may indicate that it intends to go it alone in fighting Comcast's bid, rather than bringing in a friendly suitor or "white knight." Disney's best defense would be improved results and a rising stock price. It could make an acquisition, taking on debt, to make itself harder to take over. Or it could buy back shares to further boost its stock price.

A marriage of Comcast and Disney would create the world's largest media company, with annual earnings of \$10 billion on 2003 revenue of \$43 billion.

Oct. 21 2004 05:04PM P1

FAA: Jet must be altered

Device created to stop fuel-tank explosions

By Alan Levin
USA TODAY

WASHINGTON — The federal government plans to announce today that it will require airlines to install safety devices found to prevent fuel-tank explosions like the one that blew up TWA Flight 800 just off Long Island, several sources told USA TODAY.

The devices, which flush oxygen from the tanks, will cost airlines millions of dollars to install.

Oxygen, fuel and heat must be present for tanks to explode.

As recently as 2001, an industry group advised the Federal Aviation Administration that such devices were not worth the costs.

The FAA order also will address one of the key safety recommendations prompted by the 1996 accident, which killed 230 people and destroyed a Boeing 747.

The FAA plans to give airlines seven years to install the devices on existing fleets, say several sources who have reviewed proposed action. Also, the agency plans to make changes in the design of fuel tanks on new jets to further reduce the risk of explosion, the sources say.

The devices work by slowly pumping non-flammable nitrogen gas into fuel tanks. If the nitrogen reduces the normal amount of oxygen in the air, fuel won't burn and the tank can't explode.

Since the TWA crash, the FAA has mandated a series of measures to reduce the chance of a fuel tank exploding. But FAA officials believe that enough to prevent all explosions.

The proposed changes would affect all jets in which the center fuel tank is heated by adjacent equipment. That condition exists about 35% of the time the craft is in operation.

The jets affected include all Boeing models and Airbus jets. Jets built by McDonnell Douglas, which was bought by Boeing in 1997, will not require changes.

Spokesmen for Boeing and Airbus said they had seen the FAA's proposal and could not comment. Both companies have insisted that their jets are not at risk for fuel tank explosions. Boeing has already designed a device to protect fuel tanks on its jets.

One source estimated the proposal could cost \$100,000 per jet. The devices would be installed on about 3,500 jets owned by domestic airlines, which would bring the costs to roughly \$350 million.

The airline industry is in a severe economic downturn, and several sources said they expect objections from carriers.

Behind the FAA's shift
One scientist helped make happen ▶

"I would have never had business licenses over the weekend if I had volunteered their time," Thomasson said. Contributing: Associated Press

Lower cost, higher risk helped alter FAA stance

By Alan Levin
USA TODAY

WASHINGTON — In 2001, an aviation industry group concluded that flushing oxygen from jet fuel tanks to prevent explosions was prohibitively expensive and mechanically impractical.

As early as today, the Federal Aviation Administration was to announce that it plans to require a device to do just that on all jets vulnerable to explosions in their center fuel tanks. What changed in such a short period?

An FAA scientist proved the device could be made relatively inexpensively and with virtually no moving parts, and the agency realized that the risk of fuel-tank explosions was higher than had been believed. The FAAs move appears to meet one of the key recommendations that was issued by the National Transportation Safety Board after the crash in 1996 of TWA Flight 800, a Boeing 747 that blew up shortly after takeoff from New York City. All 230 people aboard died.

The safety board, which investigates jetliner accidents, concluded that a measure such as injecting non-flammable nitrogen gas into fuel tanks was needed to ensure the tanks could not explode. The NTSB investigated accidents but has no power to regulate.

"I think it will be a major, major improvement," said Bernard Loeb, a retired NTSB official who oversaw the TWA investigation.

Officials say much of the credit for the new requirement

amendment to ban gay marriage and sent it to the House. Today, the New Hampshire Legislature will consider right-

permits same-sex marriages to continue, the group will seek an immediate review by the court. Now San Francisco has lodged a full-on assault on the ban. "It's coming in California,"



Klash

her record on the surface of Mars the rover Opportunity dug out 2,000 feet for education at Jefferson City, Mo., to receive about \$177 million in the \$2.7 billion budgeted.

Mars — SVR:USPTO-EFXRF-6/37 DNI:2738300 CSD:71-54

will join the multistate Powerball lottery.

DURATION: Urbandale, Iowa, has a jackpot of \$315 million. The District of Columbia and Maryland are members.

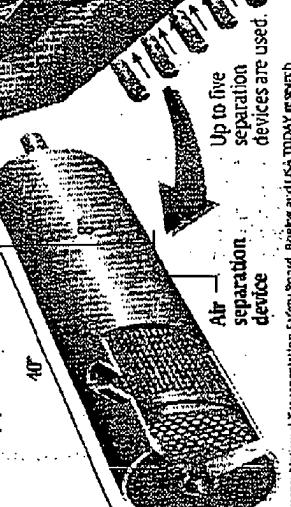
Tennessee — Kentucky and Tennessee — Kentucky and Tennessee in Powerball. There are much revenue Powerball will officials said 30 cents of every news updated 24 hours a day, at nationonline.usatodays.com

Making fuel tanks safer

The center tank in many commercial jets is heated by nearby equipment, which makes the fuel vapors explosive. The Federal Aviation Administration wants to require devices on these jets that inject a layer of non-flammable nitrogen gas over the fuel, if enough oxygen is removed, the tanks cannot explode. Boeing already has developed a prototype device, and Airbus says it is also experimenting with the concept.

How the devices work:

Nitrogen is extracted from air and then piped into the tank.



By Frank Perini and Robert Amico USA TODAY

All is one-fifth oxygen, and offer it for sale soon, officials said.

Reviews of fuel-tank safety ordered by the FAA also continued to find ways that tanks could explode. Although fuel-tank explosions are rare (four such explosions have occurred since 1989), the danger appeared greater than initially believed.

John Hickey, who oversees aircraft certification for the FAA, said last summer that the FAA-ordered review had found that nearly all commercial jet models by Boeing and Airbus were vulnerable.

Boeing, which had argued the devices weren't necessary, jumped on the bandwagon. It previously thought to prevent an explosion.

► **FAA ruling, 1A**

Fuel-tank explosions

March 3, 2001

A Thai Airways International Boeing 737 bursts into flames on the ground in Bangkok. Investigators find no evidence of a bomb and trace the explosion to the center fuel tank. No passengers are aboard, but an airline employee is killed.

July 17, 1996

A TWA Boeing 747 explodes after leaving New York City, killing all 230 aboard. The explosion is traced to the center tank. Investigators with the National Transportation Safety Board say they suspect that a short circuit created a spark that triggered the explosion.

May 11, 1990

A Philippine Air Lines 737 explodes on the ground in Manila. The blast ruptures fuel tanks on the wings, and the jet bursts into flames. Eight passengers are killed.

Nov. 27, 1989

An Avianca Boeing 727 explodes on a flight from Bogota to Cali, Colombia. Investigators say a bomb detonated in the cabin and ignited the center fuel tank, which caused a larger explosion that destroyed the jet. All 107 people aboard are killed.